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Measles, a re-emerging disease in France?

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Although measles had virtually disappeared in France after vaccination was instituted, it reappeared in 2008, with 604 cases being reported in November at the French Institute for Public Health Surveillance (InVS). The epidemic then spread in 2009 and 2010, with 1482 and 3531 cases, respectively, being reported [1]. Twenty-one of the 22 French regions are now affected by the epidemic. As compared with historical epidemics, this time we have seen a higher frequency in in infants (9%) and in individuals aged 20 years or older (38%). As stated in a recent review by Perry and Halsey [2], measles can be a serious disease in these age groups, with more frequent complications such as pneumonia or encephalitis, which certainly explains the 30.2% and 47.5% of cases of measles in young children and adults requiring hospitalization in 2010 [1].

The virus of the epidemic belongs to genotype D4. The D4 virus first appeared in France in March 2008, in a small epidemic in the region of Reims. This strain was identical to the subtype IMVs/Enfield.GBR/14.07/(D4)) identified in England in 2007. In the last trimester of 2008, a variant strain was identified in another small epidemic in Vendee (MVs/Montaigu.FRA/43.08 (D4)) [3]. Its nucleotide sequence in the N gene differs by 2.7% from the prototype strain of genotype D4: Montreal.CAN/89xD4. This virus then supplanted all other genotypes, representing 75% and 94.9% of viruses identified in 2009 and 2010. Other rare viruses were observed in 2010: one post-vaccination strain (genotype A) and four strains of African origin (genotype B3), Indonesian origin (genotype D8), Indian origin (genotype D9) and Asian origin (genotype H1).

The majority of measles cases occurred in unvaccinated individuals (82%) who had received one dose of ROR (13%) [1], these being children or adults frequently belonging to social groups with difficulty in accessing healthcare, educational religious communities, or migrant populations. These groups of highly receptive individuals, who were quite often mobile, occupied an important place in the initiation of the epidemic. But why did this genotype D4 virus emerge in the general population?

It is certain that immunization coverage has fallen below the recommended 95% (for first dose at a sub-national level). Did a variant of the measles virus emerge under any pressure of selection? We know, for example, that the sera of convalescent measles patients or of those who have been vaccinated variably neutralize the wild virus strains [4] but, conversely, the neutralizing capacity of the polyclonal response of B-cells, whether induced by infection or by vaccination, is not affected or influenced by the genotype [5]. So did this strain have an increased virulence, giving it a selective advantage, e.g. through its ability to infect certain cell types, its ability to escape the antiviral defence mediated by interferon, and increased polymerase activity?

To conclude, measles became a re-emerging disease in France in 2008. However, its eradication is still possible if, first, physicians ensure proper implementation of the immunization schedule and take measures to prevent transmission of infection around index cases, and second, health authorities strengthen the resources allocated to monitoring the epidemic and viruses.

Transparency Declaration

No conflict of interest.

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